

CLAIMS

We claim:

1 1./ A method for chroma-keying comprising deploying a coloured backdrop
2 with retroreflective elements and imaging with a camera a scene against the backdrop
3 with the backdrop principally illuminated with light from a source or sources away from
4 the camera axis.

1 2. A method as claimed in Claim 1 in which the backdrop and the scene are
2 illuminated with light of the same colour as the backdrop from a source close to the
3 camera axis.

1 3./ A method for chroma-keying comprising deploying a backdrop with
2 retroreflective elements and imaging with a camera a scene against the backdrop with the
3 backdrop illuminated with a chroma-keying light source disposed off the camera axis to
4 an extent which does not impede auto-cueing.

1 4. A method as claimed in Claim 1, the background and the scene being
2 illuminated solely by a source or sources separate from the camera.

1 5. A method as claimed in Claim 3 in which the the backdrop is coloured.

1 6./ A method of imaging a subject against a backdrop in such a way that the
2 subject is at least in part masked in the image to be viewed, said method comprising
3 deploying a backdrop with retroreflective elements, at least partially covering the subject
4 to be masked with material comprising retroreflective elements, illuminating the
5 backdrop and the subject, imaging with camera means the subject against the backdrop
6 so that light is reflected and/or scattered from the backdrop and the subject to the camera

means, and processing the image obtained to produce a viewable image in which the covered part or parts of the subject are substantially indistinguishable from the backdrop.

7. A method as claimed in Claim 6 in which the subject is imaged while operating or moving an object or objects which are prominently visible in said viewable image.

8. A method of imaging an object or objects against a backdrop during manipulation of such object(s) by a manipulating subject or subjects and/or device or devices, said method comprising:
deploying a backdrop with retroreflective elements,
at least partially masking the manipulating subject(s) and/or a device(s) with material comprising retroreflective elements,
illuminating the backdrop, the object(s) and said subject(s) and/or device(s),
imaging the same, while illuminated, with camera means against the backdrop so that light is reflected and/or scattered from the backdrop, object(s), subject(s) and/or device(s) to the camera means, and
processing the image obtained to produce a viewable image in which the masked part or parts of the manipulating subject(s) and/or device(s) are substantially indistinguishable from the backdrop.

9. A method as claimed in Claim 6 in which the viewable image so produced is such that an image representing a background scene is superimposed on the backdrop and said covered part or parts of the subject.

10. A backdrop substrate for chroma-keying comprising a coloured substrate with retroreflective elements, the substrate having a smooth surface.

1 11. A backdrop substrate as claimed in Claim 10 in which the substrate is such
2 that substantially all of the retroreflective elements are at least to some extent proud of
3 any surface structure associated with said substrate.

1 12. A backdrop substrate as claimed in Claim 10 in which the material is a
2 flexible sheet material.

1 13. A studio installation comprising a backdrop as claimed in Claim 10, camera
2 means positioned for imaging the backdrop and any subjects positioned in front of the
3 backdrop, means for illuminating the backdrop and any such subjects, and chroma-keying
4 means for processing the images derived from the camera means so as to distinguish
5 foreground subjects from the backdrop by means of light reflected and/or scattered from
6 the backdrop.

1 14. An installation as claimed in Claim 13 including autocue means viewable
2 along the optical axis of the camera means from a foreground position located between
3 the camera location and the backdrop, said illuminating means excluding any source of
4 artificial light projection along an axis substantially coincident with the optical axis of
5 the camera means.

1 15. An installation as claimed in Claim 13 in which the or each source of
2 artificial light projection constituting the illuminating means is/are off-axis with respect
3 to the optical axis of the camera means.

1 16. An installation as claimed in Claim 15 in which the or each source and the
2 camera subtend an angle of at least 10 degrees over at least a major portion of the
3 backdrop.

1 17. An installation as claimed in Claim 13 in which the light used by the
2 chroma-keying means to distinguish foreground subjects from the backdrop originates
3 primarily from sources which are not coincident or substantially co-incident with the
4 optical axis of the camera means.

1 18. A method of producing a retroreflective substrate in which a binder system
2 for adhering microbeads to a porous substrate is applied in a fluid state to a surface of the
3 substrate to form a polymeric matrix or film thereon and in which the binder while in a
4 fluid state on the substrate is forcibly drawn into the substrate.

1 19. A method as claimed in Claim 18 in which substantially all of the
2 microbeads are incorporated into the binder system prior to application of the latter to the
3 substrate.
4

1 20. A method as claimed in Claim 18 in which, to enhance drying or curing
2 thereof, the binder applied to the substrate is subjected to forced drying and/or heating
3 and/or contains a catalyst.
4

1 21. A method as claimed in Claim 18 in which at least some of the microbeads
2 are metallised to render them retroreflective.

1 22. A method as claimed in Claim 18 in which the binder system incorporates
2 retroreflective elements in the form of flakes and/or microbeads.

1 23. A method as claimed in Claim 18 in which the binder is forcibly drawn into
2 the substrate material by the application of vacuum (or partial vacuum) to the substrate
3 material.

1 24. A method as claimed in Claim 23 in which the vacuum is applied at or in
2 the immediate vicinity of the point of application of the binder to the substrate.

1 25. A method as claimed in Claim 18 in which the binder is applied to one face
2 of a substrate in the form of strip or sheet material while the latter is in motion.

1 26. A retroreflective studio backdrop or backdrop material to which is applied
2 a one-pack ink comprising retroreflective elements in a polymeric matrix and which has
3 a retroreflectivity that remains substantially uniform from normal (0°) to high ($60^\circ+$)
4 angles of incidence.

5 27. A retroreflective studio backdrop or backdrop material to which is applied
6 an ink comprising retroreflective elements in a polymeric matrix and which has a
7 retroreflectivity that remains substantially uniform from normal (0°) to high ($60^\circ+$)
8 angles of incidence, the ink being one which, prior to application to the substrate of the
9 backdrop or backdrop material, comprises retroreflective elements, microbeads
10 additional to said retroreflective elements and/or constituting said retroreflective
11 elements at least in part, binder chemicals for attaching the retroreflective elements and
12 microbeads to a substrate to which the ink is applied, and a coupling agent for coupling
13 the microbeads and cross-linking the binder chemicals, the coupling agent being
14 unreactive until the ink application process is carried out.

1 28. A backdrop or backdrop material as claimed in Claim 26 in which the
2 normalised retroreflectivity is maintained to such an extent that it is at least about $1/4$
3 at an angle of incidence of at least 60 degrees to normal.

1 29. A backdrop or backdrop material as claimed in Claim 26 in which the ink
2 is applied on to a background fabric material constituting the backdrop.

30. A backdrop or backdrop material as claimed in Claim 29 in which the fabric material has a surface structure contributing to said substantially uniform retroreflectivity.

31. A backdrop or backdrop material as claimed in Claim 29 in which the fabric comprises a woven fabric having warp and weft crowns or a knitted fabric having a stitch structure.

32. A backdrop or backdrop material as claimed in Claim 29 in which the surface structure is smooth such that substantially all of the retroreflective elements are at least to some extent proud of the surface structure of the fabric.

33. A backdrop or backdrop material as claimed in Claim 26 printed or coated in solid colour for chroma-keying.

34. A backdrop or backdrop material as claimed in Claim 26 printed in a pattern or design, or printed or coated in a single colour of retroreflective ink and overprinted with a pattern or design.

35. A backdrop or backdrop material as claimed in Claim 26 which is fire or flame retardant.

36. A backdrop or backdrop material as claimed in Claim 35 in which the backdrop comprises a fireproof or fire retardant fabric to which said retroreflective ink is applied, the fabric comprising a structural component that chars before it melts.

37. A backdrop or backdrop material as claimed in Claim 35 made fireproof or fire retardant by application of a fire retardant agent.

1 38. A backdrop or backdrop material as claimed in Claim 37 in which the fire
2 retardant agent comprises Proban ® or Pyrovatex ® or a like agent, applied to a
3 cellulosic.

1 39. A backdrop or backdrop material as claimed in Claim 26, the fabric
2 comprising an aramid fibre.

1 40. A backdrop or backdrop material as claimed in Claim 26 in which the ink
2 is non-burning once applied to the backdrop or backdrop material, the ink being aqueous-
3 based and the polymeric matrix.

41. A backdrop or backdrop material as claimed in Claim 26 in which the
polymeric matrix comprises polyvinyl chloride or other non-flammable plastisol.

42. A backdrop or backdrop material as claimed in Claim 27 in which the
coupling agent is unreactive except at elevated temperature at which the ink is cured.

43. A backdrop or backdrop material as claimed in Claim 27, at least some of
2 the microbeads being without a retroreflective coating.

1 44. A backdrop or backdrop material as claimed in Claim 27 in which the
2 binder/coupling agent system is selected from the group comprising:

3 polyvinylidene chloride copolymer as binder and (3-aminopropyl)
4 silanetriol and/or blocked 1, 6 hexamethylene diisocyanate trimer as
5 coupling agent;

6 an acrylic copolymer as binder and (3-aminopropyl) silanetriol and/or
7 blocked 1, 6 hexamethylene diisocyanate trimer as coupling agent; and
8 polyurethane as binder and blocked 1, 6 hexamethylene diisocyanate trimer
9 as coupling agent.

1 45. A backdrop or backdrop material as claimed in Claim 27 further comprising
2 one or more components selected from the group comprising:

3 pigment; humectant; buffer; dispersant; defoamer; thickening agent; cross-
4 linking agent; softening agent; carbon black; UV absorbing material; anti-
5 scuffing agent; light spill-suppressing agent; anti-static agent and water
6 repellant agent.

1 46. A backdrop or backdrop material as claimed in Claim 27 in which the
2 binder volume to bead volume ratio is equal to or less than 50%.

3 47. A backdrop or backdrop material as claimed in Claim 27 in which the
4 microbeads are all or essentially all unmetallised and the retroreflective elements
5 comprise reflective flake particles.

6 48. A backdrop or backdrop material as claimed in Claim 27 in which the
7 binder forms at least part of a liquid carrier medium in which the retroreflective elements
8 and/or microbeads are incorporated.

9 49. A backdrop or backdrop material as claimed in Claim 27 in which the
10 binder chemicals and retroreflective elements/microbeads comprise a one pack
11 retroreflective ink or a two-pack retroreflective ink with the coupling agent comprising
12 the second pack.

13 50. A backdrop or backdrop material as claimed in Claim 26 in which the ink
14 incorporates microbeads having silicate and/or silane and/or stannous chloride applied
15 thereto.

1 51. A backdrop or backdrop material as claimed in Claim 50 in which the
2 microbeads are metallised, the metal being superposed on the stannous chloride.

1 52. A backdrop or backdrop material as claimed in Claim 50 in which the
2 microbeads are metallised, the silicate and/or silane being superposed on the metallised
3 beads and the silane where present being superposed on the silicate where present.

1 53. A backdrop or backdrop material as claimed in Claim 50 in which the
2 microbeads have one or more of the following characteristics: a refractive index in the
3 range of 1.8 to 2.2; a median size in the range of 10 to 100 microns; and composed of
4 titanium/barium glass.

5 54. A backdrop or backdrop material as claimed in Claim 26, the ink being
6 water-based.

7 55. A backdrop or backdrop material as claimed in Claim 26, the ink being
8 formulated suitably for screen printing and having a viscosity less than or equal to 40
9 pascals at room temperature.

1 56. A backdrop or backdrop material as claimed in Claim 26, the ink
2 comprising a retroreflective one-pack ink having one or more of the following
3 characteristics:

4 a storage life of not less than 3 months;

5 a viscosity of between 10 and 30 pascal after storage for not less than 3
6 months;

7 a laundering durability such that retroreflectivity is not reduced by more
8 than 40% when applied to a substrate in the form of a cotton, nylon or

polyester fabric and laundered for 5 cycles in accordance with ISO 6330, method 5A; and
an abrasion resistance such that, when subjected to 5000 cycles in the Martindale Test in accordance with BS EN 530, Method 2, using the woollen abradant, at least 60% of the retroreflective beads are retained on the backdrop.

57. A method for producing a substrate for use as a studio backdrop or backdrop material which exhibits a retroreflectivity which remains substantially uniform from normal (0°) to high ($60^\circ+$) angles of incidence, said method comprising the steps of:

- making microbeads;
- suspending microbeads and reflective elements in a liquid carrier medium comprising binder chemicals for attaching the microbeads to the substrate to which the ink is to be applied and a coupling agent which couples the microbeads and cross-links the binder chemicals, the coupling agent being unreactive except at elevated temperature at which the ink-carrying substrate is cured,
- applying the liquid carrier medium on to said substrate, and
- causing or allowing the coupling agent to react during and/or after said ink application step.

58. A method as claimed in Claim 57 comprising applying an aluminium coating to the microbeads.

59. A method as claimed in to Claim 58 comprising pre-treating the microbeads with stannous chloride prior to application of the aluminium coating.

1 60. A method as claimed in to Claim 59 in which the microbeads are treated
2 with a dilute aqueous solution of stannous chloride.

1 61. A method as claimed in to Claim 57 in which the microbeads are treated
2 prior to inclusion in the liquid carrier medium with a silicate.

1 62. A method as claimed in to Claim 57 in which the microbeads are treated
2 with a silane prior to inclusion in the liquid carrier medium.

1 63. A method as claimed in to Claim 61 in which the microbeads are treated
2 with the silane following the silicate treatment.

1 64. A method as claimed in to Claim 57 in which an amino silane and/or a
2 blocked polyisocyanate is added to the liquid carrier medium as coupling agent.

1 65. A method as claimed in to Claim 57 in which a liquid carrier medium is
2 prepared comprising binder chemicals and coupling agent, and the microbeads are added
3 to the medium.

1 66. A method as claimed in to Claim 57 in which a further additive or additives
2 are incorporated in the liquid carrier medium, said additives being selected from the
3 group comprising:

4 pigment; humectant; buffer; dispersant; defoamer; thickening agent; cross-
5 linking agent; softening agent; carbon black; UV absorbing material; anti-
6 scuffing agent; light spill-suppressing agent; anti-static agent and water
7 repellant agent.

67. A method as claimed in to Claim 66 in which a thickener is added to the liquid carrier medium in two steps, namely before and after the addition of the binder and coupler.

68. A studio backdrop or backdrop material obtainable by the method claimed in Claim 57.

69. A method as claimed in Claim 1 in which the backdrop or backdrop material is one to which is applied a one-pack ink comprising retroreflective elements in a polymeric matrix and which has a retroreflectivity that remains substantially uniform from normal (0°) to high ($60^\circ+$) angles of incidence.

70. A studio installation comprising a backdrop as claimed in Claim 10, camera means positioned for imaging the backdrop and any subjects positioned in front of the backdrop, means for illuminating the backdrop and any such subjects, and chroma-keying means for processing the images derived from the camera means so as to distinguish foreground subjects from the backdrop by means of light reflected and/or scattered from the backdrop.

71. A backdrop or backdrop material as claimed in Claim 10, the backdrop being provided with a layer of retroreflective material comprising a plastisol containing microbeads treated with a substance that causes them to float in the layer of the plastisol whereby the beads on printing rise to the surface of the printed plastisol layer where they are exposed for retroreflectivity.